Climate Policy

ISSN: 1469-3062 (Print) 1752-7457 (Online) Journal homepage: www.tandfonline.com/journals/tcpo20

From parking place to public space: a factorial survey experiment on public acceptability of parking space reallocation in Germany

Katharina Goetting, Ulf Liebe & Sophia Becker

To cite this article: Katharina Goetting, Ulf Liebe & Sophia Becker (29 Aug 2025): From parking place to public space: a factorial survey experiment on public acceptability of parking space reallocation in Germany, Climate Policy, DOI: 10.1080/14693062.2025.2539140

To link to this article: https://doi.org/10.1080/14693062.2025.2539140

CLIMATE POLICY
https://doi.org/10.1080/14693062.2025.2539140

From parking place to public space: a factorial survey experiment on public acceptability of parking space reallocation in Germany

Katharina Goetting [a,b], Ulf Liebe [c] and Sophia Becker [a,b]

[a]Sustainable Mobility and Transdisciplinary Research Methods, Technische Universität Berlin, Berlin, Germany; [b]RIFS Research Institute for Sustainability at the GFZ, Potsdam, Germany; [c]Department of Sociology, University of Warwick, Coventry, UK

ABSTRACT

The transformation of urban street spaces is crucial for climate change mitigation and adaptation. Interventions such as reallocating urban spaces for low-emission mobility infrastructure, public spaces, or green spaces aim to reduce car dependency, enhance social interaction, and improve climate resilience. Despite their potential, scaling up such interventions often faces public resistance. This study investigates factors influencing public acceptability of parking space reallocation through a factorial survey experiment with a large German sample (N = 2,798). Participants evaluated scenarios varying in the type and extent of transformation, distributive justice, aligned pull measures, co-benefit framing, and participation opportunities. The results show a wide range of acceptability. A transformation into bike lanes receives slightly more support than a transformation into public squares. Respondents also show a preference for smaller changes, which may indicate a status quo bias. A distribution of remaining parking spaces based on the principle of equality is more readily accepted than one based on the principle of equity. Aligned pull measures, such as price reductions and the expansion of sustainable mobility infrastructure, also serve to increase acceptability. In addition, opportunities for participation, such as online platforms, offline events, or citizens' assemblies, have a positive impact on acceptability. Furthermore, acceptability was found to vary by several socio-demographic characteristics, mobility behaviour, political orientation, and environmental awareness. However, whether redesigns were framed with health, safety, or beautification co-benefits made no discernible difference in our sample. Taken together, our findings provide valuable insights for policymakers and practitioners in designing feasible and publicly acceptable policies for urban street reallocation.

Key policy insights

- Urban street redesign policies tend not to polarize the public; rather, public acceptability is distributed across a wide range of levels.
- Citizens generally prefer smaller changes, indicating a status quo bias and a distribution of remaining parking spaces that follows the principle of equality rather than equity.
- Aligned pull measures and participatory processes are essential for fostering public acceptability of urban space transformations.
- The impact of socio-demographic factors, mobility behaviour, political orientation, and environmental awareness suggests the need for target-group-tailored communication, while the effects of co-benefit framing need further research.

ARTICLE HISTORY
Received 5 December 2024
Accepted 21 July 2025

KEYWORDS
Acceptability; urban transition; distributional fairness; public participation; framing

CONTACT Katharina Goetting goetting@tu-berlin.de Technische Universität Berlin, Marchstraße 23, 10587, Berlin, Germany

1. Introduction

Globally, societies and policymakers face significant challenges related to automobility and land use. The transport sector is particularly struggling to reduce greenhouse gas (GHG) emissions, still accounting for approximately 15% of global CO_2 emissions (IPCC, 2023). In EU countries, a substantial share of these emissions – 87.2% in the case of domestic passenger transport – comes from passenger cars (Eurostat, 2022). Additionally, transport infrastructure plays a major role in land sealing, which reduces water permeability and leads to a loss of soil fertility (UBA, 2025a). Reducing transport-related emissions and limiting land sealing are in line with the ambitious climate targets at international, EU and national levels (e.g. UNFCCC, 2015; European Commission, 2019; KSG, 2019, 2023; UBA, 2025b). However, in Germany the transport sector is lagging behind all other sectors in meeting these targets. Since 1990, it has only reduced emissions by 10.9%, while its share of total emissions has increased by nine percentage points, reaching 22% of Germany's total emissions (UBA, 2025b). One reason for this poor climate performance may be the historically entrenched hegemony of the car industry, which hosts three of the world's ten largest automobile manufacturers (e.g. Haas, 2020; Keil & Steinberger, 2024; Statista, 2025a). Consequently, the number of private vehicles has continued to grow steadily, reaching 49.3 million by early 2025 – equivalent to an average of 588 cars per 1,000 inhabitants (Statista, 2025b; Destatis, 2025). Approximately 30% of newly registered cars in Germany are high-emission SUVs, a trend that persists as car manufacturers continue to base their business models on the production and promotion of these vehicles (Groneweg & Gehrs, 2021; Keil & Steinberger, 2024; KBA, 2025; Statista, 2025c). Moreover, car-centered urban planning combined with a strong automobile culture (e.g. Mögele & Rau, 2020; Horst, 2022) has fostered both objective and perceived car dependence (e.g. Jeekel, 2013; Wiersma et al., 2021; Mattioli et al., 2020). Furthermore, car infrastructure contributes significantly to the urban heat island (UHI) effect due to the widespread use of materials like asphalt and concrete, which absorb and retain heat (Oke, 1982; Mohajerani et al., 2017; Moretti et al., 2022). This is an especially pressing issue in cities as summer heatwaves are becoming more frequent and intense due to climate change. These conditions render urban environments increasingly uncomfortable and posing serious health risks, particularly for vulnerable groups such as the elderly and low-income residents (Ebi et al., 2021; Winklmayr et al., 2023; Rocha et al., 2024). Although alternative mobility options are increasingly emerging, most public debates in Germany – whether in daily newspapers or at mobility events – continue to focus predominantly on car-centric transport (Kallenbach, 2020). While local mobility cultures and modal splits vary between German cities (Bamberg et al., 2020; Nobis & Kuhnimhof, 2018), overall, the expansion of climate-friendly infrastructure is progressing rather slowly. Consequently, automobiles continue to occupy disproportionately large amounts of urban space relative to their modal share or total distances travelled by transport mode (e. g. Creutzig et al., 2020; Gössling et al., 2016; Guzman et al., 2021). Moreover, cars remain parked for an average of 23 hours per day (Pasaoglu et al., 2014), occupying approximately 10–37 square metres of public space each (FGSV, 2005; Kirschner, 2021; Litman, 2024). Nevertheless, the national recommendations for city planners regarding parking space dimensions were further increased in German 2023 (FGSV, 2023), while parking fees based on vehicle length were ruled invalid by the German Federal Administrative Court (BVerwG, 2023).

Addressing these forms of spatial inefficiency and injustice, and preventing carbon lock-in dynamics (e.g. Ivanova et al., 2018; Unruh, 2000; Zhao et al., 2023), requires effective policy measures (Axsen et al., 2020; Hamdi-Cherif et al., 2021; Thaller et al., 2024). One such measure involves the reallocation of street space, currently dominated by motorized individual transport, to purposes of climate mitigation (Thaller et al., 2024). This could involve transforming parking areas into green spaces, non-commercial public squares for social interaction and sharing resources, and improved infrastructure for walking and cycling. Such reallocation measures have already been implemented and tested around the globe (Harris & McCue, 2023; Klaever, Goetting et al., 2024; Marcheschi et al., 2022; Pena-Bastidas et al., 2024). However, implementing climate-friendly mobility policies often provokes conflicts, polarization and resistance (Klaever, Goetting et al., 2024; Oltra et al., 2022; Vreugdenhil & Williams, 2013). For a large-scale transformation to succeed, it is therefore crucial to assess the factors which most positively influence public acceptability. To this end, we have developed a factorial survey experiment (FSE; e.g. Auspurg & Hinz, 2015) that systematically varies different factors of parking space transformation and measures acceptability on three dimensions. In the following

sections, we first discuss the theoretical and empirical background of each FSE factor and derive the corresponding hypotheses. Next, we present the experimental design and data collection procedures. This is followed by a presentation of the main results of the FSE. Finally, we discuss the findings in light of recent literature and conclude with policy recommendations.

2. Theoretical and empirical background

2.1. Type of redesign measure

In order to select redesign policies, we based our work on the theoretical framework of Creutzig et al. (2020). The authors propose three normative perspectives on street space: a transport only perspective (streets for transport), a well-being perspective (streets as places), and a climate and sustainability perspective (streets for sustainability). We adapted these perspectives, with minor modifications, to focus on parking space transformation.

Thus, *streets for transport* provide infrastructure that enable mobility for the least able, such as children and older people (Rawlsian principle; Creutzig et al., 2020), and facilitate participation in public life (capability approach, Creutzig et al., 2020). For example, converting parking spaces into protected bicycle lanes can reduce car dependency (e.g. Mattioli et al., 2020). Besides, it can enhance perceived safety for vulnerable groups (e.g. von Stülpnagel & Binnig, 2022).

The *streets as place* perspective seeks to enhance quality of life by promoting social interaction and meeting social needs like belonging and identity. It further aims to improve physical and mental well-being, accessibility and economic activity (Creutzig et al., 2020). Prominent examples include the conversion of parking spaces into pop-up piazzas, public squares or summer streets. Such measures could be comprised of parklets, play areas for children and street furniture (e.g. Goetting & Jarass, 2023; Marcheschi et al., 2022; Senger et al., 2021).

Lastly, the *streets for sustainability* perspective addresses the global climate crisis and local air and noise pollution (Creutzig et al., 2020). This perspective also aims to limit urban expansion to prevent habitat loss and mitigate biodiversity threats (Creutzig et al., 2020). One specific strategy involves de-sealing and increasing vegetation, for instance through tree planting, to foster heat mitigation and biodiversity (Ceci et al., 2023; Cortinovis et al., 2022).

All three perspectives, along with their associated measures, have the potential to generate either local community support or opposition (Marcheschi et al., 2022). On the one hand, residents appreciate more social interaction, children's play zones and urban green (Jarass et al., 2021). On the other handy, residents may express concerns about the general lack of parking, leisure noise or littering when streets are transformed to public squares (Jarass et al., 2021; Klaever, Goetting et al., 2024). However, the implementation of bike lanes seems to provoke exceptionally strong protests such as 'bikelashes' and intense community conflicts (Field et al., 2018; Vreugdenhil & Williams, 2013). Furthermore, they may also be perceived as benefiting only a small group, namely those who cycle. Consequently, we hypothesize that acceptability varies depending on the policy measure, with policies unrelated to specific modes of transport (greenery, public squares) being more widely accepted than those perceived as benefiting cyclists exclusively, such as bike lanes (policy-measure hypothesis, H1).

2.2. Degree of transformation

In addition to the type of measure, the degree of reallocated space may significantly influence residents' acceptability. Research suggests that the more disruptive a policy measure is perceived to be, the more negatively it is evaluated by individuals (Thaller et al., 2024). One possible explanation for this reaction is the status quo bias (Samuelson & Zeckhauser, 1988). According to this bias, people tend to prefer the existing state of affairs over change, even when the change could be beneficial. Status quo bias has already been observed in the context of the mobility transition and active travel policies (Andersson et al., 2023; Böcker et al., 2022). Applying FSEs, several studies have found lower acceptability for major changes than for minor changes (Liebe et al., 2017; Liebe & Dobers, 2020). Consequently, we hypothesize that individuals are more

likely to accept a minor transformation of parking spaces (10%, reference category) than a moderate (30%) or substantial (50%) transformation (degree-of-disruption hypothesis, H2).

2.3. Distributive fairness

Regardless of how much parking space is reallocated, the remaining parking slots must be carefully regulated and allocated, particularly in areas with high parking demand. A distribution that is perceived as fair seems most appropriate, as perceived fairness is one of the most significant predictors of policy acceptability (Bergquist et al., 2022). Thus, the distribution of remaining parking spaces could adhere either to the principle of equality or equity (Adams, 1965; Deutsch, 1975, 1985; Schuitema et al., 2011; Walster et al., 1973). According to the principle of equality, all citizens would have equal access to the remaining parking spaces. This would apply regardless of whether they are used for cars, cargo bikes, or other types of vehicles. In contrast, the principle of equity suggests that parking spaces should be prioritized for those with the greatest need, such as individuals with disabilities (need principle). Alternatively, the equity principle could involve excluding vehicles that contribute most to pollution (polluter pays principle), such as sport utility vehicles (SUVs; Allam, 2024). Research on distributive fairness indicates that humans make a shift from equality-based to equity-based distribution decisions in their childhood (Huppert et al., 2019). Thus, we expect individuals to be more likely to accept the distribution of remaining parking spaces following the equity (need or polluter pays) principle compared to following the equality principle (distributive-justice hypothesis, H3).

2.4. Aligned pull measures

Besides perceived distributive fairness, accompanying push measures with complementary pull measures serves to enhance their acceptability (Gärling & Schuitema, 2007; Thaller et al., 2024). Pull measures can be distinguished as either hard or soft pull measures (e. g. Piras et al., 2022; Zarabi et al., 2024). Hard pull measures involve the intervention at the physical infrastructure level. For example, this may involve extending public transport infrastructure or providing additional shared transport services (Zarabi et al., 2024). Soft pull measures may include, among others, monetary incentive strategies. Examples of these strategies are reduced-fare promotions or free public transport tickets (Semenescu et al., 2020; Zarabi et al., 2024).

It can be argued that pull measures could provide the necessary conditions to enable mobility and participation even for vulnerable groups (e. g. low-income or older people; Moore et al., 2013) in public transport (Mwaka et al., 2024; Rozynek, 2024) and shared transport services (De Paepe et al., 2023). According to De Paepe et al. (2023) these conditions can be classified into 'availability', 'accessibility', 'affordability' and 'attractability'. For example, removing barriers such as providing ramps for wheelchairs would facilitate access for those with disabilities (accessibility; Mwaka et al., 2024), while reduced prices enable social participation for low-income families (affordability; Rozynek, 2024). In sum, hard and soft pull measures reduce behaviour costs and prevent mobility poverty. Hence, we hypothesize that individuals are more likely to accept parking space transformation when supportive pull measures such as extended and barrier-free infrastructure and price reduction of public transport and shared transport services are provided simultaneously, compared to no pull measures (control condition; pull-measure hypothesis, H4).

2.5. Co-benefits

In addition to pull measures, framing can significantly shape public opinion and the acceptability of policy interventions (Chong & Druckman, 2007; Pleger et al., 2018). Framing strategies can be categorized into attribute framing and goal framing, each of which can be presented with either a positive or negative valence (Levin et al., 1998; Pleger et al., 2018). An example of positive goal framing is the highlighting of co-benefits. Decarbonizing urban transport, for instance, not only reduces emissions but also enhances public health and safety (Creutzig et al., 2012). Health co-benefits may include cleaner air, reduced noise levels and increased physical activity (Aldred & Croft, 2019; Creutzig et al., 2012; Farzaneh et al., 2019; Smith et al., 2016), while safety co-benefits encompass a reduction in traffic-related injuries (Creutzig et al., 2012; Laverty et al., 2020).

Additionally, beautification of public space could serve as a hedonic goal in parking-related policy measures (Westin et al., 2020). Various household surveys have indicated that residents, particularly those from more privileged backgrounds, appreciate urban measures that enhance the urban livability in their neighbourhoods (e.g. Balant & Lep, 2020). However, while urban space redesigns typically aim to promote greater justice in public spaces (Creutzig et al., 2020), they also carry the risk of inadvertently fostering new forms of injustice, such as increased (green) gentrification (Anguelovski et al., 2022; Hoffmann, 2016; Liu et al., 2024). The risk of gentrification is not uniformly distributed across Germany, with urban areas being more affected than rural ones. Consequently, emphasizing beautification as a co-benefit might yield mixed results in terms of acceptability within a heterogeneous German sample. Thus, we expect individuals to accept parking space reallocation more likely if co-benefits emphasize safety or health in comparison to beautification (co-benefit hypothesis, H5).

2.6. Participatory justice

Increased public participation can improve acceptability by increasing procedural justice, which in turn heightens the perceived fairness of the outcomes (Aitken, 2010; Lubitow et al., 2016). Typically, the minimum standard for public participation involves simply providing information about planned infrastructural changes, which is often criticized as 'token participation' (Arnstein, 2019). In contrast, events and online platforms are being increasingly offered as avenues for active participation in urban planning processes (e. g. Abas et al., 2023; Kamacı, 2014). Here, citizens can voluntarily choose to contribute their ideas and critics. This often results in self-selection bias, as more educated individuals are more likely to engage (Marien et al., 2010; Rottinghaus & Escher, 2020; Schlozman et al., 2018; Verba et al., 1995). To mitigate this bias, citizens' assemblies are becoming popular (for an overview see Reuchamps et al., 2023). In citizens' assemblies, a lottery – and quota-based group of affected and informed citizens engages in decision-making alongside the municipal administration and planning team. Empirical evidence from FSEs already shows that participation options, significantly influences acceptability, compared to non-participation (Liebe et al., 2020; Liebe & Dobers, 2020). We thus expect that individuals are more likely to accept parking space transformations when invited to contribute their ideas and critiques online or offline, or when decisions are made through citizens' assemblies, compared to scenarios where they are only provided with information (participatory-justice hypothesis, H6).

2.7. Socio-demographics

There is empirical evidence suggesting that acceptability also depends on socio-demographic factors. For instance, individuals who identify as female or non-binary are more likely to support such transformations than those who identify as male (Goetting & Jarass, 2023). This may be linked to the fact that research indicates women often undertake more complex journeys in their daily lives, frequently relying on walking, cycling, or public transport to meet these diverse travel needs (Nosal Hoy & Puławska-Obiedowska, 2021). Evidence also suggests that older individuals may be more sceptical and resistant to urban space reallocation compared to younger individuals (Goetting & Jarass, 2023; Lanzendorf et al., 2024). The size of the place of residence may also affect acceptability, as the pressure for parking space is greater in large, densely populated places (Wang & Liu, 2022). Finally, citizens who position themselves more to the left on the political spectrum (Drews & Van den Bergh, 2016; Christiansen, 2020) and who drive less frequently by car may be more likely to accept parking space transformations (Lanzendorf et al., 2024).

3. Experimental design and data collection

3.1. Design and development of the factorial survey experiment

To test our assumptions, we developed an FSE. FSEs use concrete situational descriptions, or vignettes, in which multiple factors are described and systematically varied at different levels (Auspurg & Hinz, 2015; Rossi, 1979). They are more illustrative and easier for various target groups to understand compared to abstract

Table 1. Overview attributes and attribute levels in the factorial survey experiment.

Attribute	Levels
Policy measure	Cycling lane (street for transport, reference level) / public square (street as place) / greenery (street for sustainability)
Degree of transformation	10% (minor, reference level) / 30% (moderate) / 50% (substantial)
Distributive justice	Equality (reference level) / equity - need principle / equity -polluter pays principle
Aligned pull measures	(barrier-free) expansion of infrastructure / price reduction / control condition (reference level)
Co-benefit framing	Health / safety / beautification (reference level)
Participation opportunities	Information only (reference level) / contributing ideas and critiques online or offline / citizens' assembly

questionnaires (Auspurg & Hinz, 2015). Additionally, FSEs help reduce social desirability bias (Auspurg & Hinz, 2015). Hence, they are increasingly popular in social science research (Treischl & Wolbring, 2022).

In our study, the various dimensions of the FSE were initially developed by one author inspired by different real-world experiments and pop-up infrastructure in Berlin (Becker et al., 2022; Goetting et al., 2024; Goetting & Jarass, 2023; Klaever, Goetting, et al., 2024). The FSE prototype was then validated in four steps: First, it was discussed with other researchers specializing in mobility transition. Subsequently, a 'thinking aloud' method was applied with three participants – one cyclist and two car drivers – who had low educational backgrounds. This was done to ensure that the vignettes were comprehensible. Next, a pre-test (N = 136) was conducted with mobility and sustainability researchers and practitioners. Finally, we conducted a second pre-test with 114 participants from the forsa omninet panel, half of whom had low educational backgrounds. Based on the feedback in each round, we made slight adjustments to the FSE.

The final vignettes varied across six attributes presented in Table 1, which were selected based on the scientific literature and ongoing political and social debates surrounding parking transformation (see Section 2). The full factorial design comprised 729 vignettes. Each participant evaluated three text-based vignettes – one for each policy measure – randomly drawn from the full factorial pool. For each participant, the order of the redistributive policy measure was also randomized. The dependent variables for rating the three vignettes were developed by the researchers themselves (based on Liebe et al., 2020; Liebe & Dobers, 2020). They were operationalized as follows, using a 7-point response scale:

- Acceptability (attitude) and fairness: 'How do you perceive this transformation?' with response options ranging from 'very bad' to 'very good' [attitude] and 'very unfair' to 'very fair' [perceived fairness].
- Acceptability (action): 'Some people would oppose a redesign of parking space and some people would support it (e. g. sign a petition, take part in a demonstration, express their ideas or criticism online, etc.). What would you do?' with response options ranging from 'strongly oppose' to 'strongly support'.

Participants also provided information on socio-demographic variables, regular mobility behaviour (e. g. Lanzendorf et al., 2024) and perceived parking pressure (7-point Likert scale, only drivers). Regular mobility behaviour was used to calculate the amount of car use in the individual modal split (see Appendix A for detailed calculation). Additionally, environmental concern (Franzen & Mader, 2021) and political orientation (left-right orientation scale; Fuchs & Klingemann, 1989; Kroh, 2007) were measured as single items, using an 11-point scale. The FSE was part of a larger survey. The second section focused on variables operationalizing the Civic Voluntarism Model (Verba et al., 1995) and an extended Theory of Planned Behavior (Ajzen, 1991). These findings are reported in a separate publication (Goetting & Becker, 2025).

3.2. Data collection and sampling

The study was pre-registered on AsPredicted.org (#174253). It was reviewed and received ethics approval from the Research Ethics Committee at the RIFS Research Institute for Sustainability at the GFZ. All participants provided informed consent prior to participation. Data collection for the final sample took place from November 11th to December 1st, 2023, via an online survey. Participants were a sample of German adults recruited from an online panel managed by the market research agency forsa. They were compensated at the standard rate for

their time spent completing the survey. Our final sample yields 2,798 participants leading to 8,385 observations (vignettes). This provides a power of 1 to detect small effects ($f^2 = .02$) in a random intercept regression model with 12 (M1) or 19 (M2) predictors, as calculated using G*Power 3.1.9.7. Forty-seven percent of the participants identified as female, 53% as male.[1] The average age was 53 (SD = 17) years. The participants had a broad range of educational backgrounds and political orientations (left-right position scale; M = 5.64, SD = 1.85). Forty-eight percent of the sample reported using a car (almost) every day, while nine percent use public transport (almost) every day. Thirteen percent of the sample cycles (almost) every day. Other thirteen percent of the participants reported being mobility-impaired. Parking pressure was perceived very differently by car drivers, ranging from 1 (very low) to 7 (very high; M = 4.32; SD = 1.83).

4. Results

The initial section will present descriptive evidence on acceptability. Subsequently, the results of the factorial survey experiment will be presented, calculated using linear mixed-effects regression models with random intercepts.

4.1. Descriptive results

For the acceptability measure, variables assessing attitude, perceived fairness and action intention were combined into a single indicator, resulting in a satisfactory Cronbach's alpha (.903). This indicated a high level of internal consistency, meaning that the items work well together to measure the same overall concept. Figure 1 illustrates the overall acceptability for each dimension of parking space transformation as presented in the vignettes. Attitude ($M^2 = 4.04$, $SD^3 = 1.97$) and fairness (M = 3.82, SD = 1.86) scores followed almost a normal distribution within the sample, with exception for strong rejection and unfairness values (see Figure 1). Notably, more than one-third of vignette respondents indicated no intention to actively protest either for or against parking space transformations. This was also reflected in the mean value (M = 3.94; SD = 1.70).

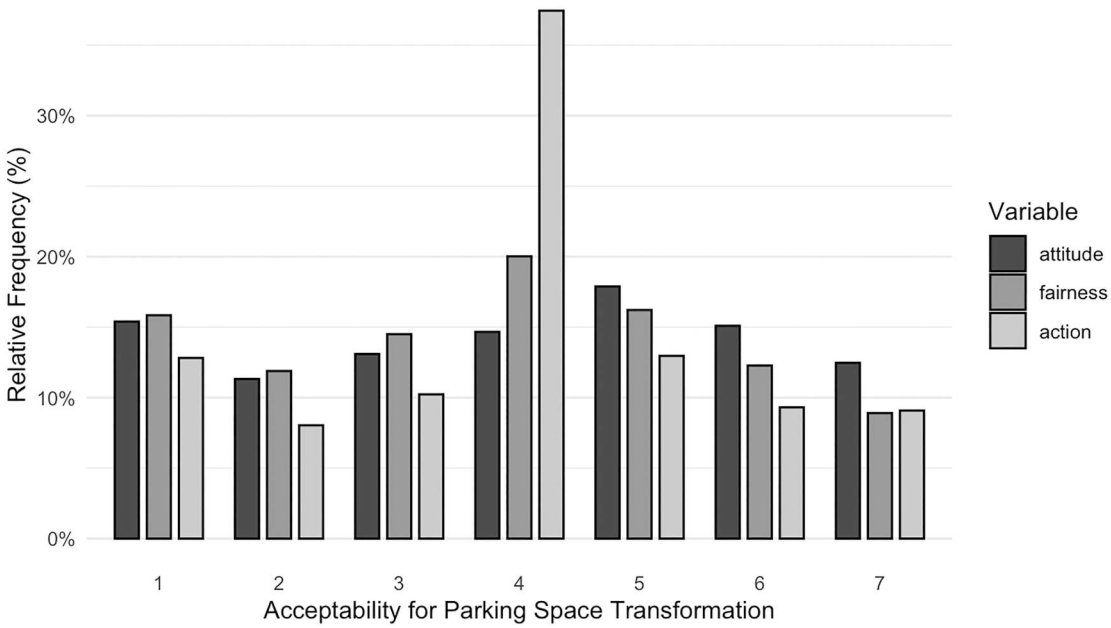

Figure 1. Acceptability levels for parking space transformation irrespective of vignette attributes.

Note: Reported are the proportion per response category on three dimensions of acceptability on 7-point Likert Scales; attitude: 1 = 'very bad' to 7 'very good'; fairness 1 = 'very unfair' to 7 'very fair'; action: 1 = 'strongly oppose' to 7 = 'strongly support'.

4.2. Factorial survey results

We employed linear mixed-effects regression models with random intercepts, treating individuals as separate groups or 'clusters' to account for the fact that each person rated three different vignettes. This approach helped to adjust for the nested structure of the data, where vignette ratings are grouped within individuals rather than being completely independent. All assumptions for the regression models were satisfied, except for the assumption of linearity in the relationship between age and acceptability. To address this, we assumed a quadratic relationship between these two variables. This indicated that acceptability is not consistently increasing with age, but younger and older respondents seemed to be more supportive than middle-aged respondents. Table B1 in Appendix B presents the results of the models. Model M1 included only the vignette attributes, while Model M2 incorporated socio-demographic variables, car use, environmental concern and political orientation. Likelihood-ratio tests for both models showed that the mixed-effects regression models were a better fit for the data better than the simpler ordinary least squares (OLS) regression models. These tests were highly significant (all p-values < 0.001), meaning there's strong statistical evidence that the more complex models provide a better explanation of the data. The intra-class correlation coefficients (ICC) are .717 for M1 and .637 for M2, suggesting a high correlation among the three vignette responses per respondent. The results indicated that acceptability of transforming parking spaces into parklets was slightly, but significantly, lower compared to transformations into bike lanes ($B^4 = -.078$). In contrast, transformations into green spaces, compared to bike lanes, had no statistically significant effect. Consequently, we rejected hypothesis 1 (H1, policy-measure hypothesis). On the other hand, the findings strongly supported the degree-of-disruption hypothesis (H2), showing that smaller transformations (10%) are more likely to gain broad acceptability compared to moderate (30%; $B = -.207$) or substantial (50%, $B = -.371$) transformations. Regarding distributive justice, respondents appeared to prefer equality over equity ($B = -.328$; $B = -.283$) distributions of remaining parking slots, which contradicted hypothesis 3 (H3, distributive-justice hypothesis). The inclusion of pull measures such as improved infrastructure ($B = .330$) or reductions in cost of alternative transport modes ($B = .335$), positively influenced acceptability, thereby confirming hypothesis 4 (H4, pull-measure hypothesis). Co-benefit framing (H5), involving aspects such as health and safety improvements compared to beautification, had no statistically significant effect in our sample. Lastly, respondents were more likely to accept the transformation of parking spaces if they were provided opportunities to contribute their ideas or express concerns, either online or offline ($B = .230$). Similar effects occurred if a citizens' assembly was involved in the decision-making process ($B = .310$). This confirmed hypothesis 6 (H6, participatory-justice hypothesis). We found that socio-demographic characteristics influence acceptability ratings. Respondents who identified as female, had a higher level of education, or used a car less frequently were more likely to support parking space transformations. In addition, higher environmental concern correlated positively with acceptability. The strongest effect was found for political orientation ($B = -.510$). Thus, respondents who hold more right-leaning political views rated the transformations more negatively than left-leaning respondents.

5. Discussion

We conducted a factorial survey experiment (FSE) to investigate under which conditions citizens are more likely to accept parking space transformation for climate mitigation. The FSE followed three normative perspectives for fair urban street space reallocation: street for transport, street as place and street for sustainability (Creutzig et al., 2020). Our findings indicate that citizens' acceptability follows a normal distribution, reflecting a diverse range of attitudes without a strong tendency toward favouring or rejecting such transformations. This result differs from the findings of Lanzendorf et al. (2024), who reported a slightly stronger support for parking space transformation in four neighbourhoods in Frankfurt, Germany. The broad spectrum of acceptability offers valuable insights for policymakers. This is particularly important, as measures supporting urban transitions are often seen as highly emotional and polarizing (Oltra et al., 2022).

When designing and implementing parking space reallocation, several factors and conditions should be considered. First, transforming parking spaces into public squares may be slightly less acceptable than transforming them into bike lanes (H1, policy-measure hypothesis). These findings align with those of Lanzendorf

et al. (2024), who reported 59% support for bike lanes, 52% for green spaces, and 36% for gastronomic areas that are related to public squares. Research conducted in real-world laboratories has identified potential concerns for the rejection of transformed public squares. These concerns refer to increased noise from leisure activities, public drinking during the night, littering and the aesthetics of street furniture (Jarass et al., 2021; Klaever, Goetting, et al., 2024). Another possible reason for the observed preference may lie in the availability of green spaces, public squares, or cycling infrastructure in the respondents' local environment. As we did not collect detailed data on participants' immediate neighbourhoods, future research should explore how such contextual factors influence the acceptability of different approaches to parking space transformation.

A clearer and more robust result emerged regarding the extent of parking space transformation. As anticipated, citizens tend to dislike major changes more than minor or moderate changes (H2, degree-of-disruption hypothesis). These findings are consistent with FSE studies from other fields (Liebe et al., 2017; Liebe & Dobers, 2020). While our findings suggest that gradual, step-by-step implementation of changes could increase acceptability, this approach is in conflict with the urgency of mitigating climate change. Instead, it is essential to explore and address the underlying factors that drive this preference for small-scale changes. In order to gain a deeper insight into our findings, it may be beneficial to conceptualize them within the context of status quo bias (Samuelson & Zeckhauser, 1988). Three factors may contribute to this bias: cognitive misperceptions, rational decision-making and psychological commitment (Godefroid et al., 2022). Individuals may be guided by cognitive misperception, such as loss aversion (Kahneman & Tversky, 1979). Consequently, they tend to perceive potential losses as being more significant than potential gains (e.g. losing parking spaces versus gaining green areas). In light of rational decision making, it might be perceived as rational to avoid uncertainty and transition costs, such as the exertion required to alter one's mobility habits. Individuals further might consider sunk costs, such as previous investments in a car. Thus, they have already established a psychological commitment to the status quo (Godefroid et al., 2022). Status quo bias has also been observed in response to other active travel policies (Andersson et al., 2023). In this study, we operationalized the degree of transformation using varying percentage levels. Future research should examine whether similar results are observed when using different thresholds (e.g. 25%, 50%, 75%) and which thresholds are perceived as minor, moderate or substantial.

Results showed that either soft (price reduction) or hard (extended infrastructure) pull measures (Piras et al., 2022) significantly enhance acceptability compared to a control condition where no aligned measures are implemented (H4, pull-measure hypothesis). These results are consistent with previous studies (Gärling & Schuitema, 2007; Lanzendorf et al., 2024; Thaller et al., 2024). The focus on implementing and effectively communicating pull measures not only increases public acceptability but also helps to mitigate issues related to mobility poverty and immobility. In particular, vulnerable groups – such as low-income households, individuals with disabilities, and those highly car-dependent due to work or caregiving responsibilities – could benefit significantly.

In addition to pull measures, our results suggest that participatory processes play a critical role in increasing the acceptability of parking space transformations, offering significantly greater benefits than simply providing information. The significance of public participation has also been demonstrated in other sectors of infrastructure development, including wind farms and airport expansions (e.g. Liebe et al., 2017, 2020; Liebe & Dobers, 2020). A novel aspect of our study is that we not only distinguish between the presence and absence of participation but also examine the potential effects of different participatory formats. Our results indicate that citizen assemblies can have a slightly greater positive impact on public acceptability than merely providing online platforms and informally invited participation events that give rise to self-selection bias. This finding encourages the introduction of citizen assemblies at the local level. Hence, a broader range of perspectives than in other forms of participation might be incorporated in planning processes. However, participation in citizen assemblies is also influenced by various socio-demographic factors (Walsh & Elkink, 2021). Accordingly, additional practical experience and further research are needed to ensure an appropriate level of representativeness. Future studies could also explore the impact of different participation formats in field experiments ideally using randomized control groups, to validate our findings.

Alongside procedural justice, distributive justice might be crucial for parking space transformation. Surprisingly, our findings suggest that citizens prefer a distribution of remaining parking spaces based on equality

compared to equity (H3, distributive-justice hypothesis). This is an interesting result in two ways: Firstly, citizens seem to accept an equal right for parking even for cargo bikes. Secondly, it could be discussed in light of current debates, for example, about higher parking fees for high-emission vehicles (Allam, 2024). Although the general public seems to prefer an equal distribution, policy makers and municipal administrations should still be aware of needs of car dependent citizens. On the one hand, people with disabilities and residents with caregiving responsibilities rely on nearby parking spaces (Goetting et al., 2024; Klaever, Goetting, et al., 2024; Taylor, 2021). On the other hand, retailers and taxi drivers need accessible delivery and parking zones (Goetting et al., 2024; Van Wymeersch et al., 2019). These latter groups are also likely to form alliances that counter dominant interests in urban redesign projects (Van Wymeersch et al., 2019). Thus, it's important to provide practical solutions and to differ between these groups in communication and framing strategies.

Based on our findings, health or safety framing does not seem to make a significant difference in public acceptability compared to beautification framing. These results can be interpreted in two ways: either citizens view all co-benefits as equally important, or they do not consider these co-benefits at all. The latter could be explained by present bias (e. g. O'Donoghue & Rabin, 1991). According to this bias, individuals prioritize short-term benefits such as keeping one's mobility pattern over long-term benefits like a healthier, safer, and more attractive living environment. Additionally, Andersson et al. (2023) found in their experimental survey that participants were more interested in what the local community thinks (social norms) and whether locals were consulted (participation) than in the health impacts of active travel policies. However, Westin et al. (2020) showed that framing car parking fees with images and messages promoting a healthy, attractive environment can be effective. In their study, such framing led to greater acceptability compared to a control group without specific framing. In light of these findings, we recommend that future studies and communication campaigns combine rather than compare different co-benefit framings. Additionally, framing transformations in terms of beautification or quality of life should be approached with caution, particularly in neighbourhoods vulnerable to gentrification (Field et al., 2018; Liu et al., 2024). Here, it may also be important support implementation with participatory methods, bottom-up approaches, and community organizing efforts that address housing and green equity (Oscilowicz et al., 2025).

Overall, implementing targeted, group-specific communication appears valuable regarding urban space transformation. This approach is further supported by our findings on socio-demographic factors, which align with results from previous studies in terms of gender (Goetting & Jarass, 2023), education and mobility behaviour (Lanzendorf et al., 2024). Our U-shaped relationship between age and acceptability is in contrast to the linear relationships found in other studies (Goetting & Jarass, 2023; Lanzendorf et al., 2024). Thus, it seems that not only the very young, but also older people are somewhat more supportive. However, given the higher average age of our sample, the results may be subject to age-related bias and should be validated in future research. We also found that participants living in areas with more than 100,000 inhabitants were less likely to accept the redesign. One explanation could be that parking pressure is higher in these places. Finally, citizens who position themselves more to the left on the political spectrum were more likely to accept parking space transformations. This finding is consistent with the results of previous studies in industrialized European countries (Drews & Van den Bergh, 2016; Christiansen, 2020). For instance, Christiansen (2020) found that in three Norwegian cities, citizens who supported left-leaning or centrist parties – those in power – were more likely to prioritize reducing parking spaces than those who supported the conservative or the progressive opposition parties. These effects were even stronger among politicians representing these parties (Christiansen, 2020).

It is important to mention some limitations of the study. Our study design aims to balance population and ecological validity. To draw conclusions for nationwide implementation, we used hypothetical scenarios, as reallocation projects are not yet widely adopted. This approach also offers a resource-efficient alternative to collecting data in many municipality. However, using scenarios can lead to hypothetical bias, noted in other FSE research (Forster & Neugebauer, 2024). To minimize this bias, we grounded our scenarios in insights from real-world labs and niche experiments. Pre-tests and using thinking-aloud methods further enhanced the realism and relevance of our findings. Since our data was collected in Germany, replicating our study design in other places and samples could lead to different results, depending on the local infrastructure, sample characteristics (e.g. car ownership), public discourses and laws and regulations in those places. It is also important to consider that acceptability can evolve dynamically over time – before, during, and after a

measure's implementation, potentially following a U-shaped curve (Ellis et al., 2023; Wolsink, 2007). Future studies should therefore incorporate this time dimension. Finally, resource and sample size limits restricted us from including all potential influencing factors on acceptability. Instead, we focused on the most widely discussed factors after consulting mobility experts.

6. Conclusion and policy recommendations

The climate crisis underscores the urgent need for large-scale transformation of mobility as well as urban street spaces to support both climate mitigation and resilience. In order to meet Germany's climate targets for 2030 – a 65% reduction in CO_2 emissions compared to 1990 levels (KSG, 2019, 2023) – comprehensive changes in the use of urban space are essential.

For instance, transforming parking spaces into cycling lanes can significantly reduce car dependency, cut greenhouse gas emissions and lower air pollution (e.g. Schmitz et al., 2021). Transforming these areas into public squares can reduce the demand for individual mobility. Creating green spaces not only absorbs CO_2 but also improves air quality, reduces surface temperatures, increases water permeability and mitigates the urban heat island effect, which is becoming increasingly severe due to climate change (e.g. Cortinovis et al., 2022). However, the implementation of these measures is slowed down, when (local) politicians or municipal administrators anticipate low acceptability. Although public discourse on such transformations often appears polarized, for example in the media, our findings indicate that there is a more nuanced spectrum of public opinion, which challenges the assumption of a sharply divided society. Therefore, we recommend that policymakers and administrators not only focus on or listen to affected residents who strongly support or oppose parking redesigns, but also consider the diversity of opinions in their campaigns and communication strategies. Our factorial survey experiment highlights factors influencing public acceptability, such as a slight preference for transformations into cycling infrastructure over public squares. Pilot projects could therefore either start with cycling infrastructure, such as pop-up bike lanes (Becker et al., 2022) or analyze the surroundings and implement what has been missing in the target neighbourhood.

Furthermore, our results are consistent with the status quo bias, with citizens generally preferring the status quo and avoiding large perceived 'losses'. Consequently, we recommend the inclusion of strategies to emotionally support citizens in coping with perceived losses. Municipal administration should facilitate behaviour change by introducing complementary pull measures. According to our findings, these pull measures could include either the expansion of (barrier-free) public transport and shared mobility options or the reduction of costs of these alternative transportation modes. To finance investments in pull measures, policymakers might consider revenue from parking management (Municipality Vienna, 2020). An additional strategy may involve the implementation of a cross-subsidization model based on income or solidarity pricing (e. g. Nguye et al., 2019). Moreover, empirical evidence suggests that investments in climate-friendly mobility infrastructure can result in cost savings in other sectors, such as healthcare (Aldred & Croft, 2019; Mueller et al., 2020; Smith et al., 2016).

In light of the perceived fairness of the distribution of remaining parking spaces, we would like to encourage practitioners to engage in a more profound discourse on the 'right to park'. In this regard, the justice principles of equality and equity could serve as a pivotal point of reference, with a particular focus on their practical application. It is therefore important to provide practical solutions and to differentiate between these principles in communication and framing strategies. Finally, participatory formats, including online or offline formats and citizens' assemblies, appear to increase public support. Municipal administrators should therefore accompany the transformation of parking spaces through participatory processes. However, there are also significant barriers to the implementation of participatory formats (Hrivnák et al., 2021). Consequently, policymakers must carefully assess the conditions under which participatory processes are feasible and the extent to which they can meaningfully incorporate diverse perspectives (Klaever, Roesner, et al., 2024; Johansson et al., 2017). For instance, it is important to consider that participation processes often attract highly motivated or interested residents, who are typically from a higher socio-economic background – a phenomenon known as self-selection bias (Marien et al., 2010; Rottinghaus & Escher, 2020; Schlozman et al., 2018; Verba et al., 1995). Additionally, planners should be aware of the participation paradox, whereby residents initially show little interest but become highly engaged during the final stages of a planning process, by which time most

decisions have already been made (Hirschner, 2017). To avoid tokenistic participation, it is essential that decision-making processes are transparent, and that residents' input is genuinely considered and binding, so that participants do not feel that their involvement is merely symbolic (Arnstein, 2019). Other participatory approaches to parking policy that can increase public acceptability include participatory budgeting and parking benefit district programmes (e.g. Johansson et al., 2017). These initiatives allow affected residents and stakeholders to decide how parking revenues are allocated within their neighbourhoods. Research on such programmes highlights the importance of including commuters and visitors in the participatory process (e.g. Johansson et al., 2017). However, providing opportunities for participation does not guarantee the absence of protests or complaints once visible changes to the streetscape occur (e.g. Johansson et al., 2017). In some cases, there is also a risk that residents will perceive the municipality as abdicating its responsibilities by outsourcing decisions to the public (e.g. Johansson et al., 2017). Furthermore, it is essential to implement parking redesigns not only in central or popular areas, but also in marginalized neighbourhoods to avoid reinforcing existing inequalities (e.g. Johansson et al., 2017). Finally, our results on socio-demographic influences indicate that targeted communication for specific groups may be beneficial. In contrast, communicating co-benefits focused on health or safety appear not to be more effective than communicating beautification, but a combination of co-benefits could be useful according to other evidence. Taking all these conditions into account policymakers and practitioners could shift public acceptability toward a more positive stance, thereby helping to reduce resistance to a climate-resilient urban transition.

Notes

1. The binary gender variable was provided by the panel provider. In addition, we measured gender using a 7-likert scale and open response for self-description following Döring, 2013 (see Appendix A). Due to substantial missing data in this variable, we relied on the binary variable, though two participants identified as non-binary.
2. Mean value.
3. Standard deviation.
4. unstandardized (regression) coefficients.

Acknowledgements

We express our gratitude to all the research participants for their time and insight. We would also like to thank Sonja Haustein for comments on the manuscript and Emily Suchy for proofreading.

CRediT authorship contribution statement

Katharina Götting: Conceptualization, Formal analysis, Investigation, Methodology, Project administration, Writing – original draft, Writing Review & Editing. Ulf Liebe**:** Supervision, Methodology, Writing Review & Editing. Sophia Becker: Funding acquisition, Writing Review & Editing, Supervision.

Disclosure statement

No potential conflict of interest was reported by the author(s).

Funding

This work was supported by the German Federal Ministry for Education and Research, FONA program, project EXPERI under Grant 01UU1902A/B.

ORCID

Katharina Goetting http://orcid.org/0009-0005-3557-7728
Ulf Liebe http://orcid.org/0000-0001-7409-9849
Sophia Becker http://orcid.org/0000-0003-3893-5840

References

Abas, A., Arifin, K., Ali, M. A. M., & Khairil, M. (2023). A systematic literature review on public participation in decision-making for local authority planning: A decade of progress and challenges. *Environmental Development*, *46*, 100853. https://doi.org/10.1016/j.envdev.2023.100853

Adams, J. S. (1965). Inequity in social exchange. *Advances in Experimental Social Psychology*, *2*, 267–299. https://doi.org/10.1016/S0065-2601(08)60108-2

Aitken, M. (2010). Wind power and community benefits: Challenges and opportunities. *Energy Policy*, *38*(10), 6066–6075. https://doi.org/10.1016/j.enpol.2010.05.062

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*(2), 179–211. https://doi.org/10.1016/0749-5978(91)90020-T

Aldred, R., & Croft, J. (2019). Evaluating active travel and health economic impacts of small streetscape schemes: An exploratory study in London. *Journal of Transport & Health*, *12*, 86–96. https://doi.org/10.1016/j.jth.2018.11.009

Allam, Z. (2024). Paris SUV policy and urban sustainability. *Nature Cities*, *1*(5), 328–328. https://doi.org/10.1038/s44284-024-00065-1

Andersson, Y., McGowan, F., Timmons, S., & Lunn, P. (2023). *Status quo bias impedes active travel policy by changing the process of opinion formation*. ESRI Working Paper.

Anguelovski, I., Connolly, J. J., Cole, H., Garcia-Lamarca, M., Triguero-Mas, M., Baró, F., Martin, N., Conesa, D., Shokry, G., & Del Pulgar, C. P. (2022). Green gentrification in European and North American cities. *Nature Communications*, *13*(1), 3816. https://doi.org/10.1038/s41467-022-31572-1

Arnstein, S. R. (2019). A ladder of citizen participation. *Journal of the American Planning Association*, *85*(1), 24–34. https://doi.org/10.1080/01944363.2018.1559388

Auspurg, K., & Hinz, T. (2015). *Factorial survey experiments* (Vol. 175). Sage Publications.

Axsen, J., Plötz, P., & Wolinetz, M. (2020). Crafting strong, integrated policy mixes for deep CO2 mitigation in road transport. *Nature Climate Change*, *10*(9), 809–818. https://doi.org/10.1038/s41558-020-0877-y

Balant, M., & Lep, M. (2020). Comprehensive traffic calming as a key element of sustainable urban mobility plans—Impacts of a neighbourhood redesign in Ljutomer. *Sustainability*, *12*(19), 8143. https://doi.org/10.3390/su12198143

Bamberg, S., Rollin, P., & Schulte, M. (2020). Local mobility culture as injunctive normative, beliefs– A theoretical approach and a related measurement instrument. *Journal of Environmental Psychology*, *71*, 101465. https://doi.org/10.1016/j.jenvp.2020.101465

Becker, S., von Schneidemesser, D., Caseiro, A., Götting, K., Schmitz, S., & von Schneidemesser, E. (2022). Pop-up cycling infrastructure as a niche innovation for sustainable transportation in European cities: An inter-and transdisciplinary case study of Berlin. *Sustainable Cities and Society*, *87*, 104168. https://doi.org/10.1016/j.scs.2022.104168

Bergquist, M., Nilsson, A., Harring, N., & Jagers, S. C. (2022). Meta-analyses of fifteen determinants of public opinion about climate change taxes and laws. *Nature Climate Change*, *12*(3), 235–240. https://doi.org/10.1038/s41558-022-01297-6

Böcker, M., Lage, J., & Christ, M. (2022). Zwischen Deprivilegierung und Umverteilung: Suffizienzorientierte Stadtgestaltung als kommunales Konfliktfeld. *Soziologie Und Nachhaltigkeit*, *8*(1), 64–83.

Bundes-Klimaschutzgesetz (KSG). (2019, 2023). *BGBl. I S. 2513, BGBl. 2024 I Nr. 235*. https://www.gesetze-im-internet.de/ksg/.

Bundesverwaltungsgericht (BVerwG). (2023). *Urteil vom 13.06.2023 – BverwG 9 CN 2.22: Ungültigkeit der Bewohnerparkgebührensatzung der Stadt Freiburg im Breisgau*. https://www.bverwg.de/130623U9CN2.22.0.

Ceci, M., Caselli, B., & Zazzi, M. (2023). Soil de-sealing for cities' adaptation to climate change. *TeMA-Journal of Land Use, Mobility and Environment*, *16*(1), 121–145.

Chong, D., & Druckman, J. N. (2007). Framing theory. *Annual Review of Political Science*, *10*(1), 103–126. https://doi.org/10.1146/annurev.polisci.10.072805.103054

Christiansen, P. (2020). The effects of transportation priority congruence for political legitimacy. *Transportation Research Part A: Policy and Practice*, *132*, 61–76. https://doi.org/10.1016/j.tra.2019.11.005

Cortinovis, C., Olsson, P., Boke-Olén, N., & Hedlund, K. (2022). Scaling up nature-based solutions for climate-change adaptation: Potential and benefits in three European cities. *Urban Forestry & Urban Greening*, *67*, 127450. https://doi.org/10.1016/j.ufug.2021.127450

Creutzig, F., Javaid, A., Soomauroo, Z., Lohrey, S., Milojevic-Dupont, N., Ramakrishnan, A., Sethi, M., Liu, L., Niamir, L., Bren d'Amour, C., Weddige, U., Lenzi, D., Korwasch , M., Arndt., L., Baumann, L., Huber, B., Mendez, E., Misiou, A., & Pearce, C. (2020). Fair street space allocation: Ethical principles and empirical insights. *Transport Reviews*, *40*(6), 711–733. https://doi.org/10.1080/01441647.2020.1762795

Creutzig, F., Mühlhoff, R., & Römer, J. (2012). Decarbonizing urban transport in European cities: Four cases show possibly high co-benefits. *Environmental Research Letters*, *7*(4), 044042. https://doi.org/10.1088/1748-9326/7/4/044042

De Paepe, L., Van Acker, V., & Witlox, F. (2023). To share or not to share, by whom is the question. Acceptability and acceptance of shared transport services by vulnerable groups. *Transport Reviews*, *43*(5), 935–969. https://doi.org/10.1080/01441647.2023.2185314

Destatis. (2025). *Straßenverkehr: Dominanz des Autos ungebrochen*. https://www.destatis.de/Europa/DE/Thema/Verkehr/Auto.html.

Deutsch, M. (1975). Equity, equality, and need: What determines which value will be used as the basis of distributive justice? *Journal of Social Issues*, *31*(3), 137–149. https://doi.org/10.1111/j.1540-4560.1975.tb01000.x

Deutsch, M. (1985). *Distributive justice: A social-psychological perspective* (Vol. 437). Yale University Press.

Döring, N. (2013). Zur Operationalisierung von Geschlecht im Fragebogen: Probleme und Lösungsansätze aus Sicht von Mess-, Umfrage-, Gender- und Queer-Theorie. *Gender – Zeitschrift Für Geschlecht, Kultur Und Gesellschaft*, *5*(2), 17–18.

Drews, S., & Van den Bergh, J. C. J. M. (2016). What explains public support for climate policies? A review of empirical and experimental studies. *Climate Policy*, *16*(7), 855–876. https://doi.org/10.1080/14693062.2015.1058240

Ebi, K. L., Capon, A., Berry, P., Broderick, C., de Dear, R., Havenith, G., Honda, Y., Kovats, R. S., Ma, W., Malik, A., Morris, N. B., Nybo, L., Seneviratne, S. I., Vanos, J., & Jay, O. (2021). Hot weather and heat extremes: health risks. *The Lancet*, *398*(10301), 698–708. https://doi.org/10.1016/S0140-6736(21)01208-3

Ellis, G., Schneider, N., & Wüstenhagen, R. (2023). Dynamics of social acceptance of renewable energy: An introduction to the concept. *Energy Policy*, *181*, 113706. https://doi.org/10.1016/j.enpol.2023.113706

European Commission. (2019). *The European Green Deal (COM(2019) 640 final)*. https://eurlex.europa.eu/legal-content/EN/TXT/?uri=CELEX:52019DC0640.

Eurostat. (2022). *Key figures on European transport – 2022 edition*. https://ec.europa.eu/eurostat/documents/15216629/15589759/KS-07-22-523-EN-.

Farzaneh, H., de Oliveira, J. A. P., McLellan, B., & Ohgaki, H. (2019). Towards a low emission transport system: Evaluating the public health and environmental benefits. *Energies*, *12*(19), 3747. https://doi.org/10.3390/en12193747

Field, A., Wild, K., Woodward, A., Macmillan, A., & Mackie, H. (2018). Encountering bikelash: Experiences and lessons from New Zealand communities. *Journal of Transport & Health*, *11*, 130–140. https://doi.org/10.1016/j.jth.2018.10.003

Forschungsgesellschaft für Straßen- und Verkehrswesen (FGSV). (2005). *Empfehlungen für Anlagen des ruhenden Verkehrs EAR 05*. https://www.forschungsinformationssystem.de/servlet/is/79656/.

Forschungsgesellschaft für Straßen- und Verkehrswesen (FGSV). (2023). *Empfehlungen für Anlagen des ruhenden Verkehrs EAR 23*. https://www.fgsv-verlag.de/ear-23.

Forster, A. G., & Neugebauer, M. (2024). Factorial Survey Experiments to Predict Real-World Behavior: A Cautionary Tale from Hiring Studies. *Sociological Science*, *11*, 886–906. https://doi.org/10.15195/v11.a32

Franzen, A., & Mader, S. (2021). Testing the measurement of environmental concern: How do single items perform in comparison to multi-item scales? In A. Franzen & S. Mader (Eds.), *Research handbook on environmental sociology* (pp. 63–78). Edward Elgar Publishing. https://doi.org/10.4337/9781800370456.00012

Fuchs, D., & Klingemann, H.-D. (1989). The left-right schema. In M. K. Jennings, & J. van Deth (Eds.), *Continuities in political action: A longitudinal study of political orientations in three western democracies* (pp. 203–234). de Gruyter.

Gärling, T., & Schuitema, G. (2007). Travel Demand Management Targeting Reduced Private Car Use: Effectiveness, Public Acceptability and Political Feasibility. *Journal of Social Issues*, *63*(1), 139–153. https://doi.org/10.1111/j.1540-4560.2007.00500.x

Godefroid, M.-E., Plattfaut, R., & Niehaves, B. (2022). How to measure the status quo bias? A review of current literature. *Management Review Quarterly*, *73*(4), 1667–1711. https://doi.org/10.1007/s11301-022-00283-8

Goetting, K., & Becker, S. (2025). Explaining political participation intention through the lens of the Civic Voluntarism Model and extended Theory of Planned Behavior. *Journal of Cleaner Production*, *519*, 145437. https://doi.org/10.1016/j.jclepro.2025.145437

Götting, K., Horn, J., Kläver, A., Rösner, V., & Scheidler, V. (2024). Wie sind die Konflikte von Straßenraumumgestaltungen zu erklären? Einblicke aus der Theorie der sozialen Repräsentationen. *Konfliktdynamik*, *13*(4), 249–263. https://doi.org/10.5771/2193-0147-2024-4-249

Goetting, K., & Jarass, J. (2023). How is the redesign of public space for active mobility and healthy neighborhoods perceived and accepted? Experiences from a temporary real-world experiment in Berlin. In E. G. Nathanail, N. Gavanas, & G. Adamos (Eds.), *Smart energy for smart transport. CSUM 2022* (pp. 701–713). Springer. https://doi.org/10.1007/978-3-031-23721-8_59

Gössling, S., Schröder, M., Späth, P., & Freytag, T. (2016). Urban space distribution and sustainable transport. *Transport Reviews*, *36*(5), 659–679. https://doi.org/10.1080/01441647.2016.1147101

Groneweg, M., & Gehrs, B. (2021). VWs Größenwahn: Wie Volkswagens SUV-Strategie den Klimaschutz untergräbt. https://www.greenpeace.de/publikationen/S03561_Report_SUV_Final.pdf.

Guzman, L. A., Oviedo, D., Arellana, J., & Cantillo-García, V. (2021). Buying a car and the street: Transport justice and urban space distribution. *Transportation Research Part D: Transport and Environment*, *95*, 102860. https://doi.org/10.1016/j.trd.2021.102860

Haas, T. (2020). Cracks in the gearbox of car hegemony: struggles over the German Verkehrswende between stability and change. *Mobilities*, *15*(6), 810–827. https://doi.org/10.1080/17450101.2020.1817686

Hamdi-Cherif, M., Li, J., & Ó Broin, E. (2021). Leveraging the transport sector to mitigate long-term climate policy costs in China: A behavioural perspective. *Climate Policy*, *21*(4), 475–491. https://doi.org/10.1080/14693062.2020.1867491

Harris, M., & McCue, P. (2023). Pop-up cycleways: How a COVID-19 "policy window" changed the relationship between urban planning, transport, and health in Sydney, Australia. *Journal of the American Planning Association*, *89*(2), 240–252. https://doi.org/10.1080/01944363.2022.2061578

Hirschner, R. (2017). Beteiligungsparadoxon in Planungs-und Entscheidungsverfahren. *Forum Wohnen Und Stadtentwicklung*, *6*(2017), 323–326.

Hoffmann, M. L. (2016). *Bike lanes are white lanes: Bicycle advocacy and urban planning*. University of Nebraska Press.

Horst, H. W. (2022). Straßenplanung wie zu Adenauers Zeiten? Die technischen Regelwerke der Forschungsgesellschaft für Straßen- und Verkehrswesen im historischen Kontext. *IVP-Discussion Paper*, *2022*(1), 1–65. https://doi.org/10.26128/2023.61

Hrivnák, M., Moritz, P., Melichová, K., Roháčiková, O., & Pospišová, L. (2021). Designing the participation on local development planning. *From Literature Review to Adaptive Framework for Practice. Societies*, *11*(1), 19. https://doi.org/10.3390/soc11010019

Huppert, E., Cowell, J. M., Cheng, Y., Contreras-Ibáñez, C., Gomez-Sicard, N., Gonzalez-Gadea, M. L., Huepe, D., Ibanez, A., Lee, K., & Mahasneh, R. (2019). The development of children's preferences for equality and equity across 13 individualistic and collectivist cultures. *Developmental Science*, *22*(2), 12729. https://doi.org/10.1111/desc.12729

IPCC. (2023). *Climate Change 2023: Synthesis Report*. Contribution of Working Groups I, II and III to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change [Core Writing Team, H. Lee and J. Romero (eds.)] (pp. 35–115).
Ivanova, D., Vita, G., Wood, R., Lausselet, C., Dumitru, A., Krause, K., Macsinga, I., & Hertwich, E. G. (2018). Carbon mitigation in domains of high consumer lock-in. *Global Environmental Change*, *52*, 117–130. https://doi.org/10.1016/j.gloenvcha.2018.06.006
Jarass, J., Nähring, A., Merzoug, S., Becker, S., Götting, K., Kläver, A., & Czeh, A. (2021). Platz statt Kreuzung–Straßenraum neu denken: Mehr Aufenthaltsqualität im öffentlichen Raum als Treiber für die Verkehrswende. *Internationales Verkehrswesen*, *73*(4), 18–22.
Jeekel, H. (2013). *The car dependent society: A European perspective (transport and society)*. Ashgate Publishing Group.
Johansson, F., Henriksson, G., & Åkerman, J. (2017). Parking benefit districts–The transferability of a measure to reduce car dependency to a European context. *Transportation Research Part D: Transport and Environment*, *56*, 129–140. https://doi.org/10.1016/j.trd.2017.08.004
Kahneman, D., & Tversky, A. (1979). Prospect theory: An analysis of decision under risk. *Econometrica*, *47*(2), 263–292. https://doi.org/10.2307/1914185
Kallenbach, T. (2020). Narratives of urban mobility in Germany: On the threshold of a departure from the car-centered city? *Sustainability: Science, Practice and Policy*, *16*(1), 197–207. https://doi.org/10.1080/15487733.2020.1799625
Kamacı, E. (2014). A novel discussion on urban planning practice citizen participation. *ICONARP International Journal of Architecture and Planning*, *2*(1), 1–19.
Keil, A. K., & Steinberger, J. K. (2024). Cars, capitalism and ecological crises: Understanding systemic barriers to a sustainability transition in the German car industry. *New Political Economy*, *29*(1), 90–110. https://doi.org/10.1080/13563467.2023.2223132
Kirschner, F. (2021). Parking and competition for space in urban neighborhoods: Residents' perceptions of traffic and parking-related conflicts. *Journal of Transport and Land Use*, *14*(1), 603–623. https://doi.org/10.5198/jtlu.2021.1870
Klaever, A., Goetting, K., & Jarass, J. (2024). Conflicts in real-world labs-Perspectives of critical and ambivalent residents on a temporary public space redesign project in Berlin. *GAIA-Ecological Perspectives for Science and Society*, *33*(1), 72–79. https://doi.org/10.14512/gaia.33.S1.11
Klaever, A., Roesner, V., Becker, S., & Scheidler, V. (2024). Lived Expertise of structurally disadvantaged: Towards a more just participatory planning process. *Mobilities*, *20*(3), 555–572. https://doi.org/10.1080/17450101.2024.2426554
Kraftfahrt-Bundesamt (KBA). (2025). *Jahresbilanz 2023 – Zahlen, Daten, Fakten*. https://www.kba.de/DE/Statistik/Fahrzeuge/Neuzulassungen/Jahresbilanz_Neuzulassungen/jahresbilanz_node.html.
Kroh, M. (2007). Measuring left–right political orientation: The choice of response format. *Public Opinion Quarterly*, *71*(2), 204–220. https://doi.org/10.1093/poq/nfm009
Lanzendorf, M., Baumgartner, A., & Klinner, N. (2024). Do citizens support the transformation of urban transport? Evidence for the acceptability of parking management, car lane conversion and road closures from a German case study. *Transportation*, *51*(6), 2073–2101. https://doi.org/10.1007/s11116-023-10398-w
Laverty, A., Aldred, R., & Goodman, A. (2020). The impact of introducing low traffic neighbourhoods on road traffic injuries. *Findings*. https://doi.org/10.32866/001c.18330
Levin, I. P., Schneider, S. L., & Gaeth, G. J. (1998). All frames are not created equal: A typology and critical analysis of framing effects. *Organizational Behavior and Human Decision Processes*, *76*(2), 149–188. https://doi.org/10.1006/obhd.1998.2804
Liebe, U., Bartczak, A., & Meyerhoff, J. (2017). A turbine is not only a turbine: The role of social context and fairness characteristics for the local acceptance of wind power. *Energy Policy*, *107*, 300–308. https://doi.org/10.1016/j.enpol.2017.04.043
Liebe, U., & Dobers, G. M. (2020). Measurement of fairness perceptions in energy transition research: A factorial survey approach. *Sustainability*, *12*(19), 8084. https://doi.org/10.3390/su12198084
Liebe, U., Preisendörfer, P., & Enzler, H. B. (2020). The social acceptance of airport expansion scenarios: A factorial survey experiment. *Transportation Research Part D: Transport and Environment*, *84*, 102363. https://doi.org/10.1016/j.trd.2020.102363
Litman, T. (2024). *Parking management: Strategies, evaluation and planning*. Victoria Transport Policy Institute.
Liu, K., Du, J., Cheng, Y., Xia, Z., & Liu, J. (2024). Green gentrification and who will benefit from green infrastructure regeneration? A quasi-experimental study in China. *Cities*, *153*, 105307. https://doi.org/10.1016/j.cities.2024.105307
Lubitow, A., Zinschlag, B., & Rochester, N. (2016). Plans for pavement or for people? The politics of bike lanes on the 'Paseo Boricua'in Chicago, Illinois. *Urban Studies*, *53*(12), 2637–2653. https://doi.org/10.1177/0042098015592823
Marcheschi, E., Vogel, N., Larsson, A., Perander, S., & Koglin, T. (2022). Residents' acceptance towards car-free street experiments: Focus on perceived quality of life and neighborhood attachment. *Transportation Research Interdisciplinary Perspectives*, *14*, 100585. https://doi.org/10.1016/j.trip.2022.100585
Marien, S., Hooghe, M., & Quintelier, E. (2010). Inequalities in non-institutionalised forms of political participation: A multi-level analysis of 25 countries. *Political Studies*, *58*(1), 187–213. https://doi.org/10.1111/j.1467-9248.2009.00801.x
Mattioli, G., Roberts, C., Steinberger, J. K., & Brown, A. (2020). The political economy of car dependence: A systems of provision approach. *Energy Research & Social Science*, *66*, 101486. https://doi.org/10.1016/j.erss.2020.101486
Mögele, M., & Rau, H. (2020). Cultivating the "car state": A culturally sensitive analysis of car-centric discourses and mobility cultures in Southern Germany. *Sustainability: Science, Practice and Policy*, *16*(1), 15–28. https://doi.org/10.1080/15487733.2020.1756188
Mohajerani, A., Bakaric, J., & Jeffrey-Bailey, T. (2017). The urban heat island effect, its causes, and mitigation, with reference to the thermal properties of asphalt concrete. *Journal of Environmental Management*, *197*, 522–538. https://doi.org/10.1016/j.jenvman.2017.03.095

Moore, J., Lucas, K., & Bates, J. (2013). *Social disadvantage and transport in the UK: A trip-based approach* (No. 1063; Working Papers Series - Transport Studies Unit, University of Oxford). University of Oxford.
Moretti, L., Cantisani, G., Carpiceci, M., D'Andrea, A., Del Serrone, G., Di Mascio, P., & Loprencipe, G. (2022). Investigation of parking lot pavements to counteract urban heat islands. *Sustainability*, *14*(12), 7273. https://doi.org/10.3390/su14127273
Mueller, N., Rojas-Rueda, D., Khreis, H., Cirach, M., Andrés, D., Ballester, J., Bartoll, X., Daher, C., Deluca, A., Echave, C., Milà, C., Márquez, S., Palou, J., Pérez, K., Tonne, C., Stevenson, M., Rueda, S., & Nieuwenhuijsen, M. (2020). Changing the urban design of cities for health: The superblock model. *Environment International*, *134*, 105132. https://doi.org/10.1016/j.envint.2019.105132
Mwaka, C., Best, K., Cunningham, C., Gagnon, M., & Routhier, F. (2024). Barriers and facilitators of public transport use among people with disabilities: A scoping review. *Frontiers in Rehabilitation Sciences*, *4*, 1336514. https://doi.org/10.3389/fresc.2023.1336514
Nguye, T. T., Nguyen, H. T. A., Xuan, C., & Fujiwara, A. (2019). Income-based fare orientation in urban public transportation services in developing countries: A case study in Hanoi, Vietnam. *Journal of the Eastern Asia Society for Transportation Studies*, *13*, 1300–1311. https://doi.org/10.11175/easts.13.1300
Nobis, C., & Kuhnimhof, T. (2018). *Mobilität in Deutschland– MiD (im Auftrag des BMVI): Ergebnisbericht*. https://www.mobilitaet-in-deutschland.de/archive/pdf/MiD2017_Ergebnisbericht.pdf.
Nosal Hoy, K., & Puławska-Obiedowska, S. (2021). The travel behaviour of polish women and adaptation of transport systems to their needs. *Sustainability*, *13*(5), 2693. https://doi.org/10.3390/su13052693
O'Donoghue, T., & Rabin, M. (1991). Doing it now or later. *American Economic Review*, *89*(1), 103–124. https://doi.org/10.1257/aer.89.1.103
Oke. (1982). The energetic basis of the urban heat island. *Quarterly Journal of the Royal Meteorological Society*, *108*(455), 1–24.
Oltra, C., Sala, R., López, S., & Germán, S. (2022). An unexpected polarization: Individual-level factors behind the public acceptance of the superblocks of Barcelona. *SocArXiv*. https://doi.org/10.31235/osf.io/9dwgk
Oscilowicz, E., Anguelovski, I., García-Lamarca, M., Cole, H. V., Shokry, G., Perez-del-Pulgar, C., Argüelles, L., & Connolly, J. J. (2025). Grassroots mobilization for a just, green urban future: Building community infrastructure against green gentrification and displacement. *Journal of Urban Affairs*, *47*(2), 347–380. https://doi.org/10.1080/07352166.2023.2180381
Pasaoglu, G., Fiorello, D., Martino, A., Zani, L., Zubaryeva, A., & Thiel, C. (2014). Travel patterns and the potential use of electric cars–Results from a direct survey in six European countries. *Technological Forecasting and Social Change*, *87*, 51–59. https://doi.org/10.1016/j.techfore.2013.10.018
Pena-Bastidas, J., Liu, J., & Jones, S. (2024). Measuring traffic speed change after the reallocation of road space for cycling: A data-driven analysis for Bogotá. *Cities*, *153*, 105296. https://doi.org/10.1016/j.cities.2024.105296
Piras, F., Sottile, E., Tuveri, G., & Meloni, I. (2022). Does the joint implementation of hard and soft transportation policies lead to travel behavior change? An experimental analysis. *Research in Transportation Economics*, *95*, 101233. https://doi.org/10.1016/j.retrec.2022.101233
Pleger, L. E., Lutz, P., & Sager, F. (2018). Public acceptance of incentive-based spatial planning policies: A framing experiment. *Land Use Policy*, *73*, 225–238. https://doi.org/10.1016/j.landusepol.2018.01.022
Reuchamps, M., Vrydagh, J., & Welp, Y. (2023). *De Gruyter handbook of citizens' assemblies*. De Gruyter.
Rocha, A. D., Vulova, S., Förster, M., Gioli, B., Matthews, B., Helfter, C., & Kleinschmit, B. (2024). Unprivileged groups are less served by green cooling services in major European urban areas. *Nature Cities*, *1*(6), 424–435. https://doi.org/10.1038/s44284-024-00077-x
Rossi, P. H. (1979). Vignette analysis: Uncovering the normative structure of complex judgments. In R. K. Merton, J. S. Coleman, & P. H. Rossi (Eds.), *Qualitative and quantitative social research: Papers in honor of Paul F. Lazarsfeld* (pp. 176–186). New York: Free Press.
Rottinghaus, B., & Escher, T. (2020). Mechanisms for inclusion and exclusion through digital political participation: Evidence from a comparative study of online consultations in three German cities. *Zeitschrift Für Politikwissenschaft*, *30*(2), 261–298. https://doi.org/10.1007/s41358-020-00222-7
Rozynek, C. (2024). Imagine the financial barrier to public transport use disappears. The impact of the 9-Euro-Ticket on the mobility and social participation of low-income households with children. *Transport Policy*, *149*, 80–90. https://doi.org/10.1016/j.tranpol.2024.02.003
Samuelson, W., & Zeckhauser, R. (1988). Status quo bias in decision making. *Journal of Risk and Uncertainty*, *1*(1), 7–59. https://doi.org/10.1007/BF00055564
Saravia, A. (2023). *Standardfragenkatalog zur Erhebung soziodemographischer und krisenbezogener Variablen*. (2. Auflage) (RatSWD Output Series, 4b (7)). Rat für Sozial- und Wirtschaftsdaten (RatSWD).
Schlozman, K., Brady, H. E., & Verba, S. (2018). *Unequal and unrepresented: Political inequality and the people's voice in the new gilded age*. Princeton University Press.
Schmitz, S., Caseiro, A., Kerschbaumer, A., & Von Schneidemesser, E. (2021). Do new bike lanes impact air pollution exposure for cyclists? – A case study from Berlin. *Environmental Research Letters*, *16*(8), 084031. https://doi.org/10.1088/1748-9326/ac1379
Schuitema, G., Steg, L., & Van Kruining, M. (2011). When are transport pricing policies fair and acceptable? *Social Justice Research*, *24*(1), 66–84. https://doi.org/10.1007/s11211-011-0124-9
Semenescu, A., Gavreliuc, A., & Sârbescu, P. (2020). 30 Years of soft interventions to reduce car use – A systematic review and meta-analysis. *Transportation Research Part D: Transport and Environment*, *85*, 102397. https://doi.org/10.1016/j.trd.2020.102397
Senger, M., Giesch, M., & Fischer, W. (2021). Temporary street transformation as an intervention for more people friendly environments in cities. A contribution within the frame of tactical urbanism. *Acta Geobalcanica*, *7*(4), 137–144. https://doi.org/10.18509/AGB217-40137s

Smith, A. C., Holland, M., Korkeala, O., Warmington, J., Forster, D., ApSimon, H., Oxley, T., Dickens, R., & Smith, S. M. (2016). Health and environmental co-benefits and conflicts of actions to meet UK carbon targets. *Climate Policy*, *16*(3), 253–283. https://doi.org/10.1080/14693062.2014.980212

Statista. (2025a). *Automobilhersteller weltweit nach Umsatz im Jahr 2024*. https://de.statista.com/statistik/daten/studie/160831/umfrage/umsatzstaerkste-autokonzerne-weltweit/.

Statista. (2025b). *Anzahl zugelassener Pkw in Deutschland in den Jahren1960 bis 2025*. https://de.statista.com/statistik/daten/studie/12131/umfrage/pkw-bestand-in-deutschland/.

Statista. (2025c). *SUVs – Germany*. https://www.statista.com/outlook/mmo/passenger-cars/suvs/germany.

Taylor, D. E. (2021). Free parking for free people: German road laws and rights as constraints on local car parking management. *Transport Policy*, *101*, 23–33. https://doi.org/10.1016/j.tranpol.2020.11.013

Thaller, A., Wicki, M., Fleiß, E., Maier, R., & Posch, A. (2024). Pushing low-carbon mobility: A survey experiment on the public acceptance of disruptive policy packages. *Climate Policy*, *24*(7), 949–962. https://doi.org/10.1080/14693062.2024.2302322

Treischl, E., & Wolbring, T. (2022). The past, present and future of factorial survey experiments: A review for the social sciences. *Methods, Data, Analyses: A Journal for Quantitative Methods and Survey Methodology (Mda)*, *16*(2), 141–170. https://doi.org/10.12758/mda.2021.07

Umweltbundesamt (UBA). (2025a). *Bodenversiegelung*. Retrieved from https://www.umweltbundesamt.de/daten/flaeche-boden-land-oekosysteme/boden/bodenversiegelung#was-ist-bodenversiegelung.

Umweltbundesamt (UBA). (2025b). *Klimaschutz im Verkehrs*. Retrieved from https://www.umweltbundesamt.de/themen/verkehr/klimaschutz-im-verkehr#undefined.

United Nations Framework Convention on Climate Change (UNFCCC). (2015). *Paris Agreement*. https://unfccc.int/sites/default/files/english_paris_agreement.pdf.

Unruh, G. C. (2000). Understanding carbon lock-in. *Energy Policy*, *28*(12), 817–830. https://doi.org/10.1016/S0301-4215(00)00070-7

Van Wymeersch, E., Oosterlynck, S., & Vanoutrive, T. (2019). The political ambivalences of participatory planning initiatives. *Planning Theory*, *18*(3), 359–381. https://doi.org/10.1177/1473095218812514

Verba, S., Schlozman, K. L., & Brady, H. E. (1995). *Voice and equality: Civic voluntarism in American politics*. Harvard University Press.

Vienna, M. (2020, May 15). *Parking meter charge regulation* [Parkometerabgabeverordnung] §7 F 420-040.

von Stülpnagel, R., & Binnig, N. (2022). How safe do you feel? – A large-scale survey concerning the subjective safety associated with different kinds of cycling lanes. *Accident Analysis & Prevention*, *167*, 106577. https://doi.org/10.1016/j.aap.2022.106577

Vreugdenhil, R., & Williams, S. (2013). White line fever: A sociotechnical perspective on the contested implementation of an urban bike lane network. *Area*, *45*(3), 283–291. https://doi.org/10.1111/area.12029

Walsh, C. D., & Elkink, J. A. (2021). The dissatisfied and the engaged: Citizen support for citizens' assemblies and their willingness to participate. *Irish Political Studies*, *36*(4), 647–666. https://doi.org/10.1080/07907184.2021.1974717

Walster, E., Berscheid, E., & Walster, G. W. (1973). New directions in equity research. *Journal of Personality and Social Psychology*, *25*(2), 151. https://doi.org/10.1037/h0033967

Wang, S., & Liu, Y. (2022). Parking in inner versus outer city spaces: Spatiotemporal patterns of parking problems and their associations with built environment features in Brisbane, Australia. *Journal of Transport Geography*, *98*, 103261. https://doi.org/10.1016/j.jtrangeo.2021.103261

Westin, K., Nordlund, A., Jansson, J., & Nilsson, J. (2020). Goal framing as a tool for changing people's car travel behavior in Sweden. *Sustainability*, *12*(9), 3695. https://doi.org/10.3390/su12093695

Wiersma, J. K., Bertolini, L., & Harms, L. (2021). Spatial conditions for car dependency in mid-sized European city regions. *European Planning Studies*, *29*(7), 1314–1330. https://doi.org/10.1080/09654313.2020.1854691

Winklmayr, C., Matthies-Wiesler, F., Muthers, S., Buchien, S., Kuch, B., An der Heiden, M., & Mücke, H. G. (2023). Heat in Germany: Health risks and preventive measures. *Journal of Health Monitoring*, *8*(4), 3–32. https://doi.org/10.25646/11651

Wolsink, M. (2007). Wind power implementation: The nature of public attitudes: Equity and fairness instead of 'backyard motives'. *Renewable and Sustainable Energy Reviews*, *11*(6), 1188–1207. https://doi.org/10.1016/j.rser.2005.10.005

Zarabi, Z., Waygood, E. O. D., Olsson, L., Friman, M., & Gousse-Lessard, A.-S. (2024). Enhancing public transport use: The influence of soft pull interventions. *Transport Policy*, *153*, 190–203. https://doi.org/10.1016/j.tranpol.2024.05.005

Zhao, C., Dong, K., Wang, K., & Taghizadeh-Hesary, F. (2023). How can Chinese cities escape from carbon lock-in? The role of low-carbon city policy. *Urban Climate*, *51*, 101629.

Appendices

Appendix A

Mobility behaviour / car use was measured following a large representative mobility survey in Germany (Nobis & Kuhnimhof, 2017) and other researchers (e.g. Lanzendorf et al., 2024). First, the daily mobility (private car, car sharing, public transport, private bike, cargo bike, bike sharing, e-scooter, by foot, others) was determined on a 5-level Likert scale from 'never' to '(almost) daily' in order to determine the proportionate car use. Subsequently, an average number of days per month was assigned to the frequency categories of the scale (almost daily = 22, 1–3 times per week = 8, 1–3 times per month = 2, less frequently than monthly, never = 0) and summed up per

person for all means of transport. The frequency of car and car sharing use is then divided by the summed frequency of all means of transport use, resulting in a percentage of residents' modal split within a month focusing on car use and car sharing.

Perceived parking pressure. Drivers were asked how they perceive finding a parking space in everyday life with the following question: 'How difficult or easy is it for you to find a parking space in everyday life?' The response scale ranged from 1 = *very difficult* to 7 = *very easy*. In addition, an option for 'I don't know / no answer' was provided.

Environmental concern. Participants rated their perceived environmental concern on a Likert-scale from 0 = *not at all environmentally concerned* to 7 = *very environmentally concerned* following the question: 'On a scale of 0 to 10, how environmentally conscious do you rate yourself?'. In addition, they could choose 'I don't know / no answer'. This scale was adapted from Franzen and Mader (2021).

Left-right orientation scale. For assessing the political orientation, we adopted the left-right orientation scale, developed and used by Fuchs and Klingemann (1989) and Kroh (2007). Participants read the following text: 'In politics people sometimes talk about 'left' and 'right'. Using this card, where would you place yourself on this scale, where 0 means left and 10 means right?'. Response scale ranged from 0 = *left* to 10 = *right*. Additional, respondents could choose 'I don't know / no answer'.

Education. Participants provided information about their school education (6 categories from still in school until high school graduation (Abitur)) and additionally indicated their vocational training (11 categories from no vocational training to academic degree) following a scale from Saravia (2023). Participants with an academic degree could further specify their degree, choosing between seven categories from Bachelor to Doctorate. Subsequently, eight categories were formed following the ISCED 2011 classification.

Gender information was obtained from the panel provider, exclusively employing a binary classification (male/female). Additionally, we measured social gender on a 7-point scale from masculine to feminine, following Döring (2013). Participants were presented with an information text and had the option to specify their gender identity in an open-response format if they did not identify with the scale. Unfortunately, due to numerous missing values in this variable, we had to utilize the binary variable for our analysis.

Policy measure. The vignette attribute policy measure varied between transforming XX % into respondents' neighborhood into (a) cycling lanes (street for transport), (b) public squares with benches and play and sports equipment (street as place) and (c) greenery by removing the asphalt and planting it (street for sustainability).

Degree of transformation. This vignette attribute was implemented in combination with factor 1 (policy measure) and varied the degree of transformation between 10 (minor), 30 (moderate), and 50 (substantial) percent.

Distributive justice varied between (a) equality, where half of the remaining parking spaces could be used by all modes of transportation equally (e.g. cars, taxis, e-scooters, cargo bikes, etc.), equity – need principle, where half of the remaining parking spaces may only be used by people with disabilities, care services and delivery services and (c) equity – polluter pays principle, where half of the remaining parking spaces may no longer be used by vehicles with high CO_2 emissions.

Aligned pull measures varied between (a) soft pull measures such as price reduction for public transport and sharing services, (b) hard pull measures such as the expansion of (barrier-free) public transport and sharing services and (c) a control condition with no changes in public transport and sharing services.

Co-benefits. For the co-benefit condition participant got informed that in other cities either (a) residents perceived their neighbourhoods as more attractive (beautification), (b) residents felt healthier (health) or (c) the number of accidents decreased (safety) after such redesign.

Participation opportunities varied between (a) receiving an information letter but no involvement in the decision-making process, (b) the option to share ideas or critics about the redesign at a public event or through an online platform, and (c) a group from the community – made up of people with different levels of education, ages, and cultural and social backgrounds – will work with planners to make decisions about what will happen.

Acceptability (attitude / fairness). The attitude and fairness dimension of acceptability were assessed by asking participants: 'How do you perceive this transformation?' The response options ranged from 1 = 'very bad' to 7 = 'very good' for attitude and from 1 = 'very unfair' to 7 = 'very fair' for perceived fairness. Participant were also free to choose 'I don't know / no answer'.

Acceptability (action). For the action dimension of acceptability participants read the following text and questions: "Some people would oppose a redesign of parking space and some people would support it (e. g. sign a petition, take part in a demonstration, express their ideas or criticism online, etc.). What would you do?". Then, they could respond on a scale ranging from 1 = "strongly oppose" to 7 = "strongly support" or chose "I don't know / no answer".

Appendix B

Table B1. Results of random effects models for vignette attributes and controls for socio-demographics.

Attribute	Attribute Level	M1 *B (t)*	*p*-value	M2 *B (t)*	*p*-value
Policy measure	Parklets (vs. bike lane)	−0.078 (−3.277)	0.001**	−0.078 (−3.285)	0.001**
	Greenery (vs. bike lane)	0.033 (1.372)	0.170	0.032 (1.361)	0.174
Degree	30% (vs. 10%)	−0.205 (−7.291)	<0.001***	−0.207 (−7.429)	<0.001***
	50% (vs. 10%)	−0.370 (−13.138)	<0.001***	−0.371 (−13.297)	<0.001***
Distributional fairness	Need (vs. equality)	−0.319 (−11.261)	<0.001***	−0.328 (−11.689)	<0.001***
	Polluter pays (vs. equality)	−0.274 (−9.689)	<0.001***	−0.283 (−10.105)	<0.001***
Pull measures	Infrastructural (vs. control)	0.334 (11.813)	<0.001***	0.330 (11.784)	<0.001***
	Financial (vs. control)	0.336 (11.878)	<0.001***	0.335 (11.956)	<0.001***
Co-benefits	Health (vs. beautification)	0.011 (0.395)	0.693	0.006 (0.223)	0.823
	Safety (vs. beautification)	0.026 (0.913)	0.362	0.021 (0.741)	0.459
Participation	Contribute ideas (vs. information)	0.231 (8.206)	<0.001***	0.230 (8.277)	<0.001***
	Cit. assembly (vs. information)	0.309 (11.065)	<0.001***	0.310 (11.219)	<0.001***
Gender				0.120 (2.442)	0.015*
Age				−0.093 (−3.758)	<0.001***
Education				0.054 (2.204)	0.028*
Size of residence				−0.167 (−3.105)	0.002**
Mobility behaviour				-0.402 (-15.421)	<0.001***
Political orientation				-0.510 (-20.058)	<0.001***
Environmental concern				0.164 (6.487)	<0.001***
Intercept		3.923 (81.199)	<0.001***	3.806 (43.598)	<0.001***
Number of vignettes		8385		8385	
Number of respondents		2798		2798	
Log-Likelihood		−13898.418		−13454.395	
SD random effects		1.412		1.175	
SD error		0.886		0.886	
Intraclass correlation		0.717		0.637	

Notes: *$p < 0.10$; **$p < 0.05$; ***$p < 0.01$, presented are unstandardized coefficients and t-values in brackets.